

RESPONSE TO COMMENTS
DRAFT TMDL REPORT FOR QUASHNET RIVER, HAMBLIN POND, LITTLE
RIVER, JEHU POND AND GREAT RIVER
1/31/2006 REVISION

TOWN OF FALMOUTH INTERNAL REVIEW COMMENTS

June 10, 2005

Submitted by Amy Lowell, Falmouth WWTF Superintendent

Comment: As explained in a letter sent to Brian Dudley and Michael Ackerman, the Town feels that this Draft TMDL report was issued prematurely, since a number of steps in the MEP process had not yet been completed, including Town comment, workshop with towns, revision of MEP report, and public release/public presentation of the MEP report. Town comments on the MEP report have been forwarded as well, for your information.

Response: MassDEP expanded the timeline for review of both the Technical Report and the TMDL to accommodate the Town's concerns.

Comment:Page 1, first paragraph says "The TMDL allocation establishes the maximum loadings...that a water body may receive and still meet and maintain its water quality standards" and paragraph after numbered items says "After public comment...the TMDL will serve as a guide for future implementation activities." I think this language comes directly from the Clean Water Act, but it seems that the understanding of the TMDL has evolved since the act was written and as you explain later in the report (page 15), the listed TMDLs are just one load number based on one scenario, and that really it is the thresholds that will not vary, and towards which the Towns will be encouraged to aim (not the TMDLs).

Response: The statement is correct. The threshold concentrations at the sentinel stations is one way to look at the goal.

Comment: Page 7, Figure 4. This figure shows that the sediments contribute 40% of the nitrogen load to these subembayments. In comments on MEP reports, Town asked a number of questions about benthic flux and the model's sensitivity to this widely ranging input.

Response: There is a lot of variability in the benthic flux, both negative and positive. To put it in proper perspective, it should be considered a pass through from other sources. As the N load decreases from the watershed the benthic flux moves toward zero.

Comment:Page 10, number 1) says that "sentinel subembayments" are selected. Aren't single sentinel points within embayments selected? That is what was done with Great, Green and Bournes Ponds. It's less clear to me what the sentinel locations were in the Quashnet report (whether they were points or regions, and where they were).

Response: Section VIII.2 of the Technical Report gives a more detailed discussion of the 3 sentinel stations chosen.

Comment:Page 13, fourth bullet says "watershed nitrogen loads were lowered....until the nitrogen levels reached the threshold level." See comments on MEP report, Section VIII – it's not clear that that is what was done, at least not for Hamblin Pond load determination.

Response: The discussion is in Section VIII.2 of the Tech Report (page 131).

Comment: Page 15, second full paragraph. This explanation of the use and context of the TMDLs is helpful.

Response: Comment appreciated.

Comment: Page 15, Table 4 - Title of first column is present “controllable” watershed load, but in Table ES-2 of the MEP report, these same numbers are titled “present watershed load” which includes natural background (not controllable). Maybe this column is footnoted correctly in the TMDL report and not in the MEP report.

Response: For the purpose of the TMDL MassDEP has added in the natural background as a separate source of nitrogen.

Comment: Page 18 – The text at the top of this page doesn’t seem to follow from the preceding section...is something missing?

Response: The paragraphs in this Load Allocation section simply describe the different sources of nitrogen as listed in the first paragraph.

Comment: Page 21. The discussion of CWMP and the “adaptive management approach” is helpful in explaining how Towns will be allowed to proceed with implementation.

Response: Comment appreciated.

Comment: Page 22. What are the DEP’s thoughts on how progress towards the goal of meeting nitrogen concentration thresholds will be monitored over time? Change over time in average annual TN concentration measured at a certain depth at a single sentinel point? Average of concentration measurements across the water column, a tidal cycle and/or over an area? It would be helpful to add some discussion on this subject to the TMDL report.

Response: A detailed monitoring plan should be developed as part of the CWMP process. Until details on the N loading reduction plan are sketched out, it would be too early to suggest a detailed monitoring plan.

Comment: Appendix B – Only includes Jehu/Hamblin, not Quashnet. Is there a page after 25 in this report?

Response: The Quashnet River Estuary has been added to Appendix B.

Keith Dobie
F. R. Mahony & Associates, Inc.
273 Weymouth Street
Rockland, MA 02370

Comment: Something came up last night at the meeting that I would like to comment on. I realize that this will be an issue that needs to be dealt with by the towns and their consultants yet I still feel I should comment. It was mentioned that single family nitrogen removal systems only remove about 50% of the nitrogen and that would not be sufficient for the needs of the area being discussed. That statement is not accurate. The misconception comes from the fact that Massachusetts initially only approved systems that were essentially aerobic treatment units designed for secondary treatment and accepted the incidental denitrification level that is achieved by those units. There are single family systems available that are designed for true biological nutrient removal including true control of aerobic and anoxic periods where the wastewater is in full contact with the biomass. There have not been many of these systems installed since they did not gain approval in the first batch of systems approved under Title 5 and of course they are slightly more expensive than simple aerobic treatment units. Dr. Howes mentioned that package plants in the area already obtain very good nitrogen removal and are more cost effective. I believe that he was referring to some of the BNR plants that we have provided on the Cape. It is true that they can provide excellent results but when considering the cost of a collection system they are not always the lowest cost solution. With the technology being used for single family BNR systems being continually refined and considering the time line for the Waquoit project, I believe that single family BNR treatment systems coupled with a proper management plan

should be evaluated for many areas on the Cape. You might want to follow a pilot program currently underway in the Pinelands area of New Jersey. Their goal for single family BNR systems is significantly lower than the 19 mg. /L. that Massachusetts uses.

Response: Thank you for bringing this interesting and potentially useful option to our attention. MassDEP believes that all potential options should be evaluated by the Towns to achieve the ultimate goal.

Robert Allen

My wife and I were among the 40 persons pleased to attend and to hear your and Mr. Halterman's presentation at WEBNERR July 28th.

We speak for many more when we say that we are indeed grateful for the course of your general studies, your concern for the greater environment, your application of your knowledge to our Waquoit area--and your giving us the evening program.

We wish now and in the future to support your work in any way we can.

As to the meeting itself, permit me to say that the audience that evening was perhaps more a 'Downstream Group' than you may have realized.

That is, most persons who were in the room have been following the danger signals and the commendable efforts to deal with our problems for a long time.

(Most of us present were old enough to have grown up swimming eel grass and being nipped by crabs.)

Therefore, much of what was presented we already knew.

Moreover, what we didn't already know could have been presented much more succinctly.

The real question to have been asked--and answered--was 'What can any of us persons in the room especially do to help?'

Was there ever a two hour presentation that could not have been completed in one hour?

(Just recall your days in a classroom.)

Respectfully submitted,

Robert Allen

We are pleased to see the good coverage given to the meeting in the Falmouth and Mashpee Enterprise.

Response: Your comments are well taken. We will certainly review our presentation and boil it down to a more succinct version. As to the question, what can people do to help, the most important thing you can do is to stay in touch with Town planning activities and support appropriate requests for action intended to address this important environmental problem.

Mike Hill

USEPA Region I

Comments from prior version of TMDL

Thank you for the opportunity to review the draft total nitrogen TMDL for the Quashnet River, Hamblin Pond and Jehu Pond in the Waquoit Bay.

EPA offers the following comments.

Comment: Please indicate how many TMDLs are in this document (e.g., TMDLs

on 303(d) listed segments, 303(d) listed segments that are split into additional segments each with a TMDL and protective TMDLs on non-impaired segments.)

Response: There are five as listed in Table 1A.

Comment: Executive Summary, Target Threshold Nitrogen Concentrations and Loadings, p. ii, 2nd ¶, penultimate sentence: Are range of target thresholds of 0 to 52 kg/day correct?

Response: They have now been updated to 2-27 kg/day.

Comment: Page 4, Problem Assessment: Consider adding language to strengthen assumption as to why nitrogen concentrations may not have been of concern prior to 1951 (e.g., few houses and associated waste disposal systems present and presence of eel grass as indicated in aerial photographs, etc).

Response: The language has been added.

Comment: Pages 5 and 6, Problem Assessment, last ¶: Does the comparison between the 1951 and present aerial surveys indicate that more eel grass has been lost in the upper inland reaches?

Response: Yes

Comment: Page 6, Pollutant of Concern, Sources and Controllability: Discuss the role of nitrogen sinks and why they occur.

Response: Language has been added to this section.

Comment: Page 13, Application of the Linked Watershed-Embayment Model: Please strengthen rationale as to why the nitrogen thresholds may be different in different sub-embayments (an example may be helpful).

Response: When restoring habitat the nitrogen thresholds chosen depend on what habitat is chosen as the restoration goal. As an example, eelgrass habitat generally requires a lower nitrogen threshold than does benthic fauna habitat.

Comment: Page 14, Table 3 and Page 18, Load Allocations: Explain negative benthic fluxes and why they cannot be relied on for nitrogen removal.

Response: There is a lot of variability in the benthic flux, both negative and positive. To put it in proper perspective, it should be considered a pass through from other sources. As the N load decreases the benthic flux will also vary as a result of these actions and ultimately moves toward zero.

Comment: Pages 18, Seasonal Variation: With the aim of clarifying this section, please consider revising language to state something along the lines of: Since the TMDLs for the waterbody segments are based on the most critical time period, i.e. the summer growing season, the TMDLs are protective for all seasons. The daily loads can be converted to annual loads by multiplying by 365 (the number of days in a year). Nutrient loads to the sub-embayments are based on annual loads for two reasons. The first is that primary production in coastal waters can peak in both the late winter-early spring and in the late summer-early fall periods. Second, as a practical matter, the types of controls necessary to control the N load, the nutrient of primary concern, by their very nature do not lend themselves to intra-annual manipulation since the majority of the N is from non-point sources. Thus, the annual loads make sense, since it is difficult to control non-point sources of nitrogen on a seasonal basis and that nitrogen sources can take considerable time to migrate to impacted waters.

Response: The language has been added.

Comment: Page 23, Reasonable Assurances: Recommend deleting “such as the town of Rehoboth’s stable regulations.”

Response: The language has been replaced.

J.P. Hanks

Technical comments and questions

Comment: Page 1 Last Paragraph, line Include Mashpee and Barnstable as data collectors.

Response: The language has been added.

Comment: Page 2 Table 1A The description of the extent of “Hamblin Pond MA96-58_2002” as” From inlet of Red Brook to outlet of Little River and inlet/outlet of Waquoit Bay west of Meadow Neck Road, Falmouth/Mashpee” is confusing. Clarify whether the extent is to the beginning of Little River, (South corner of Hamblin Pond) or where Little River joins Great River, or empties into Waquoit Bay. To be consistent, it should be an “inlet/outlet” like the other one.

Response: The table has been modified.

Comment: Page 4, Table 1B. Explain the notes “no data” for Chlorophyll-*a* for Little River and Great River. Samples were collected. Also, see page 12 where the 4th paragraph after table 2 states: “Dissolved oxygen and chlorophyll *a* were also considered in the assessment.”

Response: This table is based on the information in Table VIII-1 of the technical report. The language in the discussion of the D.O. and chlorophyll *a* data assessment has been modified.

Comment: 5th paragraph after Table 2. Re-calculate Table ES-1 of Quashnet.pdf. The numbers do not come out accurately (within 5 or 6 %). See recalculated Table ES1 attached (Table ES-1 of Quashnet.pdf.xls). Then the 32% cited in the last sentence can be derived. (Better still, unless the numbers are wrong, add percentages to Table 3 in this document and reference it.) The numbers work.

Response: For the purpose of the TMDL MassDEP has added in the natural background as a separate source of nitrogen.

Comment: Table ES-1 includes “atmospheric deposition to lakes” in the “present non-septic loading” column then includes “direct atmospheric deposition” in a separate column. Justify. (Granted there are no lakes on Seconset or Monomoscoy).

Response: Direct atmospheric deposition is to land.

Comment: Page 24 Table VI-6. Explain the gaps in the table and the 0.000 value for FW Red Brook Pond. We collected samples from all stations in Waquoit on 14 Aug 01,

Response: Not all stations had data every year. In order to be used for this analysis at least 3 years of data must be available. Your data however will still be useful for future analysis. The 0.000 value should have been a dash indicating insufficient data. The appendix on page 24 has been corrected.

Spelling, Grammatical and other presentation comments

Comment: Page 14, paragraph 1 first bullet: In the sentence” It appears that achieving the nitrogen target at the sentinel stations will be restorative of eelgrass habitat **with** the Hamblin

Pond/Little River and Jehu Pond/Great River systems and restorative of infaunal habitat throughout Quashnet River. “With” should be “within”

Response: The language has been corrected.

Comment: Page 17, Paragraph titled Wasteload Allocations, first line. It appears that the word “of” should be inserted between “portion” and “the” so that the phrase reads “---portion of the---”. If that is not what was meant, then correct the sentence.

Response: The language has been corrected.

Comment: Page 22 The link in the second paragraph:

“<http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html>” does not work, so should be corrected to:

“<http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html>”

Response: The paragraph has been deleted.

David Dow

Acting Chair, Cape Cod Group - Sierra Club

Comment: Since the MEP provides monitoring and modeling science to support Mass DEP’s development of quantitative TMDLs for total nitrogen, it is important that the science be credible.

Response: MassDEP believes that the science and analytical procedures are credible and defensible. Each TMDL is based on data from a minimum of three years of water column sampling, as well as parcel by parcel loading estimates, atmospheric deposition, sediment flux, fertilizer use, to name some of the data collected. The data are modeled using established, peer-reviewed models (see attached discussion of literature in which models and related analytical approaches are presented).

Comment: The draft document should provide a measure of the model precision and uncertainty for the TMDL value for each subembayment within the Waquoit Bay system.

Response: The EPA allows for a margin of safety in the TMDL values. This can be implicit, or explicit. The Department and SMAST have elected to incorporate implicit margins of safety in the TMDLs. This is done by using conservative assumptions in the modeling and analytical methodologies.

Comment: The Bowen and Valiela paper (2004) discusses management recommendations for structural approaches to reducing nutrient input from the Waquoit Bay watershed (preservation of intact forested tracks, freshwater bodies and saltwater wetlands) and these should be included as potential options in the draft document.

Response: The Department is giving the towns the option to choose alternative methods for mitigating nitrogen loadings to the embayments. The TMDL has listed several major loading reduction strategies, but by no means feel that the list of examples contains every possible option. However, natural forests loading rates are acknowledged as extremely low load sources (and are actually used as natural background loads), and freshwater bodies and saltwater wetlands are specifically mentioned as potential sites for natural attenuation of groundwater nitrogen.

Comment: The draft document mentions providing advice on the cost/benefit values for different mitigation approaches, but provides little detail.

Response: Cost/benefit analyses are part of the next step in the TMDL/implementation process. The towns, with the help of their consultants and SMAST (and future modeling scenarios) will develop alternative and recommended approaches to reduce nitrogen loading, and working with Mass DEP, will develop Comprehensive Wastewater Management Plans.

Comment: The draft document establishes the TMDLs based upon either what is required to recover eelgrass beds or reduce impairment of benthic infauna communities, but this does not mean that the restoration programs described in the CWMPs will be able to achieve these goals. Since the public will need to invest a lot of money to support the restoration effort, there needs to be a realistic assessment of the likelihood of success.

Response: The re-establishment of eelgrass and reductions of impairment of the benthic infauna communities will be dependant on several factors, the most important of which is the reduction of the high nitrogen concentrations in the estuaries, and the excessive plant growth (epiphytes on eelgrass stems, phytoplankton, and macroalgae) that occurs as a result of the high nitrogen. This then leads to shading of the eelgrass plants and increased organic loading to the sediments (thus impacting the benthic communities). However, there are other factors that will have to be “right” for the eelgrass to return. Because of the known overloading of nitrogen into the systems, and the known link to nitrogen pollution and eelgrass loss, the MEP “process” is based on reducing nitrogen to concentrations that will allow the eelgrass to return. Simply put, regardless of the other conditions needed, unless nitrogen concentrations are reduced, the eelgrass WILL NOT return. The goal is that towns and citizen groups need to start looking at the other variables. To this end, Mass DEP and SMAST have begun discussions on how to bring eelgrass restoration probability prediction methodologies into the overall MEP/town effort – specifically for the implementation of the TMDL, not necessarily as part of the TMDL itself.

SMAST and DEP are very familiar with the work of Dr. Fred Short at UNH, who has developed an index of eelgrass restoration suitability. This index incorporates nitrogen concentration along with other variables such as chlorophyll concentration, water clarity, sediment type, water depth, and water velocity, to predict success of restoration. Dr Short also has an extensive eelgrass transplant program that can be used by communities to speed up the natural process of re-establishment of eelgrass beds, once the water quality has been improved. Mass DEP and SMAST will discuss the work of Dr. Short, and others, so restoration of eelgrass can also be factored into future TMDL implementation activities.